Chico Golden Empire Amateur Radio Society, Inc.

"Dedicated to Public Service"

THE RADIATOR

SPECIAL SERVICE CLUB

W6RHC
IRLP #8170

www.gearsw6rhc.org
P.O.Box 202 Chico, CA 95927

August 2024 Newsletter	GEARS Founded August 13, 1939

July has been a sad and stressful month for GEARS. The Park fire has directly affected several GEARS members, some evacuating from their homes. Meanwhile the sight of smoke has made all of us remember the Camp Fire less than six years ago.

The GEARS East repeater in Forest Ranch is working again. It is located within a few hundred feet of the fire line. PG&E power has been intermittent and our battery backup isn't working. I'm testing adding the Win System to our UHF repeater.

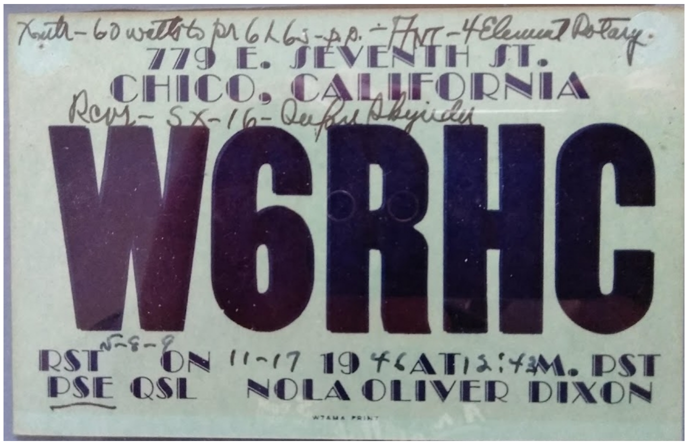
Sadly two long time GEARS members became silent keys in July. Stephen McDermott K6AKF passed away on July 1 and David Wilkinson WB6IDF passed away on July 4. They will both be missed.

This month GEARS will celebrate our 85th birthday. Kris Koening KKØNIG has generously offered use of his Golden Beaver Distillery, 2420 Park Ave Chico for our anniversary party. It will be a pot luck/BBQ. Meet there at Noon, Sunday August 11th.

It was Sunday, August 13th 1939 when eleven local amateur radio operators and their families met at Sycamore Pool for a picnic and established the Golden Empire Amateur Radio Society.

They were:
Frank Warnick W6KYO president, Butte City
Burr A. Heywood W6DPL vice president, Chico
N.O. Dixon W6RHC secretary-treasurer, Chico
Ken Keller W6PFH, Princeton
Boyd Hart W6RAQ, Chico
Henry Davis W6DTV, Chico
Dan Cortopassi W6GHP, Roseville
Al Guilliford W6FPN, Lincoln
Charles Keplinger W6OUY, Butte City
Mason Stockton W6KUJ, Glenn
Chet Uilum W6BDW, Gridley

Nola Dixon's call sign became the GEARS Club call sign. Here is one of his QSL cards from 1946.



Xmtr - 60 watts to pr 6L6s - p.p. - Ant - 4 Element Rotary.
779 E. SEVENTH ST.
CHICO, CALIFORNIA
Rcvr - SX-16 - Super Skyrider
W6RHC
RST 5-8-8 ON 11-17 1946 AT 12:43M. PST
PSE QSL NOLA OLIVER DIXON

At the next GEARS meeting on August 19th. We are planning an FT-8 demonstration. See article in this Radiator issue for some basic information.

The next Chico Ham Radio Breakfast is on Saturday August 10, 9am at Farmer's Skillet Chico.

'73s
Jim Matthews K6EST

August 2024 Calendar

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 7:30pm Simplex Net	2	3
4 8pm OARS Net 2pm VEC testing Chico	5 7pm GARS Net 8pm ARES Net 7pm GEARS Board meeting	6 7pm PARS Net 7:30pm GEARS Net	7	8 7:30pm Simplex Net	9 7pm OARS meeting 7pm GARS meeting	10 9am Chico Breakfast
11 8pm OARS Net Noon GEARS Anniversary Potluck	12 7pm GARS Net 8pm ARES Net	13 7pm PARS Net 7:30pm GEARS Net	14	15 7:30pm Simplex Net	16	17
18 8pm OARS Net	19 7pm GARS Net 8pm ARES Net 6pm GEARS Meeting	20 7pm PARS Net 7:30pm GEARS Net	21	22 7:30 Simplex Net	23	24
25	26 7pm GARS Net 8pm ARES Net	27 7pm PARS Net 7:30pm GEARS Net	28	29 7:30 Simplex Net	30	31 9am OARS Breakfast

VEC Testing, FCC License Exam available by appointment. For information or registration call Tom Rider, W6JS 530-514-9211
Chico Breakfast 2nd Saturday 9am Farmers Skillet Cohasset Rd, Chico
GEARS Board Meeting 1st Monday 7pm by Google video meetups.
PARS Meeting 2nd Thursday 6:30pm, doors open 6pm Old Magalia Community Resource Center
OARS Meeting Second Friday of the month, St. Pauls Episcopal Church Hall, Oroville.
GARS Meeting Second Friday of the month, Lutheran Church Hall, Artois.
GEARS Meeting, Doors open 6pm, meeting 7pm at Chico Public Library, 1108 Sherman Ave, Chico
OARS Breakfast 4th Saturday of the month, at Cornucopia of Oroville.

NETS:
OARS Club Net Sunday 8pm 146.655 Mhz - PL 136.5
GARS Club Net Monday,7:00 pm 147.105 MHz + PL 110.09, secondary: 146.850 MHz-PL 110.9
Yuba Sutter Club Net Monday 7pm 146.085 MHz + PL 127.3
GEARS Club Net Tuesdays 7:30 PM 146.850 MHz - PL 110.9
PARS Club Net Tuesday 7pm 145.290 - PL 110.9
Simplex Net Thursday 7:30 p.m. 146.52 no tone
Yuba Sutter ARES Net Thursdays 7pm 146.085 MHz + PL 127.3
Sacramento Valley Traffic Net Nightly 9:00 PM 146.850 MHz - PL 110.9

FT8 Mode Basics—What is it and How Do I Get Started?

By Elizabeth Klinc, KE8FMJ

Joe Taylor, K1JT, announced the availability of a new mode in the WSJT-X software suite, FT8, on June 29, 2017. Created by K1JT and Steve Franke, K9AN, FT8 stands for “Franke-Taylor design, 8-FSK modulation.” WSJT-X is a computer program used for weak-signal radio communication between hams. Note that this says weak signal and not necessarily low power. The program was initially written by K1JT, but is now open source and is developed by a small team.

K1JT highlighted some of its important characteristics:

* T/R sequence length: 15 s

* Message length: 75 bits + 12-bit CRC

* FEC code: LDPC(174,87)

* Modulation: 8-FSK, tone spacing 6.25 Hz

* Constant-envelope waveform

* Occupied bandwidth: 50 Hz

* Synchronization: 7×7 Costas arrays at start, middle, and end

* Transmission duration: 79*1920/12000 = 12.64 s

* Decoding threshold: -20 dB; several dB lower with AP decoding

* Multi-decoder finds and decodes all FT8 signals in passband

* Optional auto-sequencing and auto-reply to a CQ response

* Operational behavior similar to JT9, JT65

Getting Started

You need a radio with SSB capability. HF or SSB VHF is where FT8 can be found. You also need an audio interface. Some radios have this built in, requiring only a simple USB cord. The ICOM IC-7300, Yaesu FT-991A, and Kenwood TS-590SG are good examples of base stations that have this built-in capability. The ICOM IC-7100 HF/VHF/UHF transceiver is a mobile radio that has the audio interface built in.

If your radio does not have a built-in sound card interface, you can still access this function through an external sound card. There are quite a few products that can be used for this. One of the most popular is the Tigertronics SignaLink™ USB Interface Unit.

Now that you have the necessary hardware, you need software to run the program. You can download WSJT-X from the WSJT-X website, which notes:

“WSJT-X implements communication protocols or ‘modes’ called FST4, FST4W, FT4, FT8, JT4, JT9, JT65, Q65, MSK144, and WSPR, as well as one called Echo for detecting and measuring your own radio signals reflected from the Moon. These modes were designed for making reliable, confirmed QSOs under extreme weak-signal conditions.”

What constitutes a QSO in FT8? Here’s an example of a normal FT8 contact:

“CQ KE8FMJ EM89”	CQ call from KE8FMJ
“KE8FMJ N8DXE EN91”	N8DXE replies with location
“N8DXE KE8FMJ-10”	KE8FMJ responds with a signal report
“KE8FMJ N8DXE R-09”	N8DXE replies with own report
“N8DXE KE8FMJ RR73”	KE8FMJ says Report Received and Best Regards
“KE8FMJ N8DXE 73”	N8DXE says Best Regards

Each message takes 15 seconds to send. There are four slots per minute; you transmit for one 15 second block, listen for replies for 15 seconds, and transmit again for 15 seconds. Therefore, the above exchange would take about 90 seconds for a full QSO!

One last detail of importance—your computer’s clock must be extremely accurate with FT8. A computer clock can be notorious for drifting off, and FT8 needs to transmit with perfect timing to work well. This means that you need to keep your computer clock accurate to the precise second. The program Dimension 4 is perfect for keeping the computer clock accurate. It runs in the background and keeps the clock in sync by constantly resetting the time to one of the online atomic clock servers at an interval of your choosing.

Picking the best battery for portable Ham Radio

by Michael Martens KB9VBR

What battery should I use for portable operation? That’s a big question as I’m currently using three different batteries depending on the situation. But they all share a common trait, so let’s dig into battery power.

When I started operating portable many years ago, batteries were heavy and had limited power capability. A common battery, like this 30 amp hour lead acid AGM battery would give you a few hours of operation time before its capacity would drop to a point you would have to put it on a charger. Lithium technology was new and expensive, so we suffered with these inefficient, heavy batteries out in the field.

Fast forward a few years and not only is an equivalent Lithium Iron Phosphate battery cheaper than a lead acid battery, but it also has a longer service life, making the total cost of ownership even cheaper.

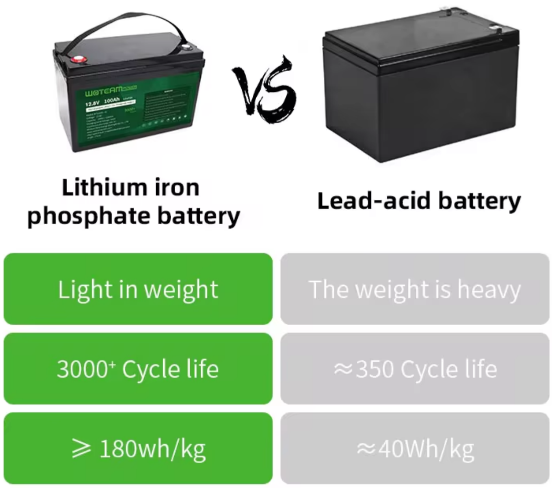
Lead Acid vs Lithium Iron Phosphate (LiFePO4)

Now there are certain cases where a lead acid battery is a better choice, but for casual portable operating those exceptions dont’ come into play and you will benefit with using a lithium battery.

When I say lithium battery, I mean Lithium Iron Phosphate. There are many types of lithium batteries with different chemistries. Lithium iron phosphate is most common in ham radio circles as they are much safer than other forms of lithium cells. I’ll talk about the safety features in a bit.

So why lithium iron phosphate and not lead acid batteries? There are two main reasons. The first is the size and weight. The main component of a lead acid battery is, you guessed it, lead. These batteries are heavy. Approximately 3 to 5 times as heavy as an equivalent lithium battery. If you've had to carry a battery for any appreciable distance, you know you don't want it to be a lead acid battery.

The second point is energy density. That's the amount of power a battery is capable of holding. A lead acid battery can hold about 30-50 watt hours per kilogram of weight, while a lithium iron phosphate battery is on the line of 90-120 watt hours per kilogram. Related to this energy density, a lead acid battery can only be discharged to about 50 percent of it's capacity before it needs to be recharged, otherwise damage to the cells can occur. Lithium iron phosphate batteries can go down to 80 to 90 percent of capacity, so they can deliver more energy for a longer period of time.



Lithium iron phosphate battery	Lead-acid battery
Light in weight	The weight is heavy
3000^+ Cycle life	≈350 Cycle life
⩾ 180wh/kg	≈40Wh/kg

Also important to consider about lithium iron phosphate batteries are their safety features. Now of course any battery is dangerous in that it can hold a large amount of power, so like anything electric, treat it with respect. But the lithium iron phosphate chemistry is intrinsically safer and won't catch on fire or explode from overcharging like other lithium batteries. These batteries also have a battery management system, or BMS to regulate the charge input and output of the battery. The BMS will make sure you don't overcharge the battery and it will prevent you from depleting the battery down to 0 percent. The BMS will also help prevent you from drawing more current than what the cells will allow. They also provide other load balancing and cell management functions, so they are an important part of the operation of the battery.

What I use for batteries

I have three different batteries that I use with my FT-891. All of them are Lithium Iron Phosphate (LiFePO4). I started out with a 12 ah battery. At 50 watts transmit power SSB I can usually get about 2.5 hours with it.

A couple years ago, I bought a little bigger 20ah battery. I like this one a lot as it will last all weekend if I use it exclusively for phone operation, with digital or a mixture of phone and digital, it will last for an afternoon, about 3-5 hours.

In my camping trailer I had a 50ah battery, but last year I upgraded that to a 100 ah battery. With the bigger battery in the trailer I can run the refrigerator all weekend even if we are in a shaded campsite. Since I started doing more digital operation, I started to bring the 50ah battery with me on the longer outings. This will last all weekend with phone and heavy digital operation. This is also the battery I'll grab if I'm running mobile or portable for a QSO party as I know I won't run out of power.

With the exception of the camping trailer, which has full time solar charging, I don't bring solar panels out in the field to charge the radio batteries. I find that it's easier to carry a bigger battery with me than to set up a solar panel and try to move it every hour or so to catch the sun. I just pick an appropriate sized battery for the duration I'm going to operate and when I'm done, I'm done.

My favorite battery is the Eco-Worthy 20 ah LiFePO4 battery. It has really held up well the last two years and it is dirt cheap online: https://amzn.to/44oOfYV

How big of a battery do I need?

But the biggest question I get is, how large of a battery do I need? The answer depends on two things: how long will you be on the air, and what will your transmit power be. These both factor into your overall energy budget. For QRP operation, 10 watts or less, you can get by with very small lightweight batteries. If you want to transmit at 100 watts, you are going to need a battery that will cover that amount of current draw. If you are primarily phone operation, you can get by with a little smaller battery, and if you are running full duty cycle, like many of the digital mode do, then you will need more battery capacity.

A battery isn’t going to provide more than its rated capacity. If the battery says 20 amp hours, for the most part it will provide up to 20 amps of current. You’ll be able to run 100 watts of phone on a 20 amp hour battery because the efficiency of a sideband signal will seldom get you to that 20 amp limit. But a 12 amp hour battery will limit the current output, cutting your transmit power.

GEARS Officers:

President.....……..........…Jamie Johnson KN6PWW
Vice-President..................Larry Mitchell KF6NCX
Treasurer..........................Jim Matthews K6EST
Secretary…………………..Vacant
Director.............................Bennett Laskey K6CEL
Director.............................Darrell Chestanult KN6QXL
Director.............................Kevin Sterling K7KFS
Past President..……........…Paul Stewart N6PAS
VEC Chairman....……......Tom Rider W6JS

GEARS Newsletter archive is here:
https://drive.google.com/GEARS
Follow GEARS on Facebook www.facebook.com

GEARS Newsletter edited by Jim Matthews K6EST

JiminChico@yahoo.com

Your dues and contributions support our local repeaters, ARES, Field Day and outreach events to keep amateur radio alive in our area. GEARS also makes donations to support other local repeaters and clubs.

GEARS Dues and Donations can be made online at
paypal.me/w6rhc
Or by mail to:
GEARS
PO Box 202
Chico, CA 95927

Good News, GEARS t-shirts are now available anytime.

Cali Custom t-shirt shop in the Chico Mall (Marketplace) has our logo on file and can make a customized shirt for you. They can also do GEARS hoodies and other items.

Just go in and ask for what you want. The artwork is filed under GEARS.